

Assembly Language and Computer Organization

CSCE 2610, Section 003

Fall 2023

Class Timings: Class is offered on Canvas.

Instructor: Robin Pottathuparambil, Email: rpottath@unt.edu, Office Hours: Tuesday and Thursday, 1:00 PM – 3:00 PM or by appointment. Zoom: <https://unt.zoom.us/j/87093047443>

Teaching Assistants:

- Pranathi Vasireddy, Email: pranathivasireddy@my.unt.edu, Student Hours: Monday and Friday 3:00 PM – 5:00 PM, Zoom: <https://unt.zoom.us/j/87070341567> (Homework and Quiz Grading)
- Ibrahim Alkuwaifi, Email: ibrahimalkuwaifi@my.unt.edu, Student Hours: Tuesday and Wednesday 9:30 AM – 11:30 AM, Zoom: <https://unt.zoom.us/j/8049692329> (Programming Assignment Grading)

Course Webpage: All the course related material will be posted on the course webpage which is available through Canvas (<https://unt.instructure.com/>)

Course Outcomes:

- Understand the role of the different classes and components in a computer system and the interface between software and hardware in a computer system.
- Apply metrics to evaluate performance of a computer system using clock rate and clock cycles per instruction (CPI). Understand the different aspects of execution times reported when program complete their execution.
- Understand instruction set choices and write assembly language programs for simple C code and codes that include procedures.
- Perform integer and floating-point calculations using computer arithmetic algorithms.
- Describe the organization of a simple processor with data path and control path for simple instructions.
- Describe the requirement of memory hierarchy and evaluate the performance of different cache organizations.

Program Outcome Mapping:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Text: *Computer Organization and Design: The Hardware Software Interface: ARM Edition* by Patterson and Hennessy, Morgan Kaufmann, ISBN-13: 978-0128017333

Catalog Description: Prerequisite: CSCE 2100, EENG 2710 or 2720. Principles of computer systems organization, instruction sets, computer arithmetic, data and control paths, memory hierarchies, and assembly language.

Topics:

- Computer Abstractions and Technology
- Instructions: Language of the Computer
- Arithmetic for Computers
- The Processor
- Large and Fast: Exploiting Memory Hierarchy

Grading:

Module Activity	5%
Homework	12%
Quizzes	12%
Programming Assignments	20%
Midterm Exam (10/10/2023)	21%
Comprehensive Final Exam (12/14/2023)	30%

Modules: The course is organized as modules and a module is opened up every week. There are 15 modules and each module will open up on Sundays and the assignments will be posted with due dates during the week. Modules have text, figures, and videos to make certain topics clear to the learner. The topics can be revisited any number of times but the assignments cannot be taken if it passes the due date.

Module Activity: There will be module activity after the end of few modules that will reinforce the concepts that you learned through this online class. These activities will be scheduled online during each week and should be completed before Saturday, 11:55 PM of the scheduled week. Once you complete the activity, the correct answers and your score will be shown immediately. Once you complete the module activity you can retake the module activity. You will be given 10 minutes for each attempt and will be given a total of two attempts.

Homework: Homework will be in the form of definitions, theoretical questions, and problem sets with a due date one week after it is assigned. Homework will be assigned on Tuesdays as per the schedule. **No late homework will be accepted.** Homework must be done individually (you will learn the most from this). Any evidence of group participation or direct copying from sources like previous year's solutions, textbook, solutions, Wikipedia, websites, and other sources will be interpreted as academic dishonesty. Using AI (Artificial Intelligence) assisted websites to generate or auto generate solutions will also be interpreted as academic dishonesty. There will be five to six homework assignments. There will be five to six homework assignments.

Quizzes: There will be six to seven quizzes given throughout the semester. The quizzes will be scheduled sometime during a week and needs to be completed before Saturday, 11:55 PM of the scheduled week. These will be to reward students who are consistently reading the modules and are putting an effort to understand the key concepts. **These quizzes can be only taken using a computer/laptop with Respondus LockDown browser, webcam, and a microphone.**

Programming Assignments: The programming assignments are an integral part of the course and are intended to provide experience in the application of the concepts discussed in lecture. Programming assignments will be assigned on Thursdays as per the schedule and with a due date of two weeks after it is assigned. There will be four to five programming assignments assigned. Programming assignments must be done individually and can be done on your own PC or using the server. Any evidence of group participation will be interpreted as academic dishonesty. Using AI (Artificial Intelligence) assisted websites to generate or auto generate solutions will also be interpreted as academic dishonesty.

Exams: There will be a midterm exam and a final exam. The exams are closed books and closed internet. Mobiles phones are not permitted and browsing the internet is not allowed. **These exams require Respondus LockDown browser, webcam, and a microphone. Students using assistive technologies that are not compatible with Respondus Lockdown browser can request for the exams to be proctored using Zoom. Please make early arrangements with the instructor and testing center.** Exams will include material from the modules, the readings, homework, and programming assignments and should be taken individually and not as a team. Final exam will be comprehensive.

- **Midterm Exam:** Total time allowed is 80 minutes and will be available on Canvas from Tuesday, October 10th, 2023 7:00 PM till 9:00 PM
- **Comprehensive Final Exam:** Total time allowed is 2 hours and will be available on Canvas from Thursday, December 14th, 2023 6:00 PM till 9:00 PM.

Missing Classes/Assignments/Exams: Attendance at all exams, quizzes, and class activities is mandatory. Throughout the semester, a student may miss classes, assignments, quizzes, or exams due to many reasons. Most of the reasons will not be accepted as an "excused" absence. Assignments, quizzes, or exams can be made-up only under extraordinary circumstances and only when notification is given to me before the quiz or exam is administered. A no-show for a quiz or exam without prior notification and a verifiable excuse (appropriate official documentation) results in a grade of 0 for that quiz or exam.

COVID-19 Impact on Attendance: Students are expected to attend class meetings regularly and to abide by the attendance policy established for the course. It is important that you communicate with the professor and the instructional team prior to being absent, so you, the professor, and the instructional team can discuss and mitigate the impact of the absence on your attainment of course learning goals. Please inform the professor and instructional team if you are unable to attend class meetings because you are ill, in mindfulness of the health and safety of everyone in our community.

If you are experiencing any [symptoms of COVID-19](#) please seek medical attention from the Student Health and Wellness Center (940-565-2333 or askSHWC@unt.edu) or your health care provider PRIOR to coming to campus. UNT also requires you to contact the UNT COVID Team at COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure.

Materials for Online Instruction: Students will need access to a laptop, calculator, webcam and microphone to participate in the fully online class. Additional required classroom materials for online learning include access to cse servers. Information on how to be successful in a remote learning environment can be found at <https://online.unt.edu/learn>.

Disputing Grades: If you have a dispute with how an assignment, quiz, or exam is graded, you should get the solution to the assignment, quiz, or exam off the course web site and examine it. If you really believe that your answer is correct (matches the answer given in the solution), contact the grader and discuss it with him. The grader will listen to your concern, and act on it, at their discretion. In any case, they will regrade the assignment and will communicate with you. The solutions for programming assignments will not be posted, so contact the grader for discussing the grade if you have met all the requirements of the programming assignment and you have lost points. Note that instructor or grader addition errors should follow the above procedure. Assignments, quiz, exam, and homework grades are disputable for **one week** from the day the grades were assigned on Canvas.

Syllabus Revisions: This syllabus may be modified as the course progresses. Notice of such changes will be by email or announcement in class.

Course Policies: You are expected to spend at least 10 hours per week for this course. Keep all your graded assignments, quizzes, and tests for study and review. You should track your own progress on

Canvas and be aware of current grades throughout the term. If you would like to look at the graded assignments, meet me during my office hours or setup an appointment. Final grading will be done as follows. **A:** $\geq 90\%$, **B:** $\geq 80\%$ and $< 90\%$, **C:** $\geq 70\%$ and $< 80\%$, **D:** $\geq 60\%$ and $< 70\%$ and **F:** $< 60\%$. Grades will be curved if necessary. Grades cannot be changed after they have been electronically entered into the university's system except for instructor error. Any extenuating circumstances that may adversely affect your grade must be brought to my attention before the final course grades are recorded. To be considered, such circumstances must be unusual, unavoidable, and verifiable.

Disability Services/Special Needs: UNT complies with all federal and state laws and regulations regarding discrimination including the Americans with Disability Act of 1990 (ADA). If you have a disability and need a reasonable accommodation for equal access to education or services, please contact the Office of Disability Accommodation. Please initiate this process and inform me during the first two weeks of class.

Academic Dishonesty: All the provisions of the University code of academic integrity apply to this course. In addition, it is my understanding and expectation that your signature on any test or assignment means that you neither gave nor received unauthorized aid. For homework and programming assignments, while discussion is allowed, direct copying is not, and students must turn in individual submissions. Using AI (Artificial Intelligence) assisted websites to generate or auto generate solutions will also be interpreted as academic dishonesty. All students are required to know, observe and help enforce the UNT Code of Student Academic Integrity. Academic dishonesty will result in disciplinary action according to UNT Policy 06.003. The penalty for a first offense can range from a formal warning to an 'F' for the course. Regardless of the penalty imposed, a record of the offense will be kept in the Office of the Dean of Students.

Student Perceptions of Teaching (SPOT): Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The short SPOT survey will be made available **November 21 – December 8** to provide you with an opportunity to evaluate how this course is taught.

Tentative Course Schedule:

Week	Lecture	Assignments Due
08/20 – 08/26	Computer Abstractions and Technology	
08/27 – 09/02	Computer Abstractions and Technology	
09/03 – 09/09	Instruction set	Homework 1
09/10 – 09/16	Instruction set	Programming Assignment 1
09/17 – 09/23	Instruction set	Homework 2
09/24 – 09/30	Instruction set	Programming Assignment 2
10/01 – 10/07	Arithmetic for Computers	Homework 3
10/08 – 10/14	Review/Midterm Exam	Midterm Exam
10/15 – 10/21	Arithmetic for Computers	
10/22 – 10/28	Processor design	Programming Assignment 3
10/29 – 11/04	Processor design	Homework 4
11/05 – 11/11	Processor design	Programming Assignment 4
11/12 – 11/18	Processor design	Homework 5
11/19 – 11/25	Thanksgiving Break	No Classes
11/26 – 12/02	Memory Hierarchy	Programming Assignment 5
12/03 – 12/09	Memory Hierarchy/Review	Homework 6
12/10 – 12/16	Comprehensive Final Exam	Final Exam